



ATTACHMENT 1

55. A bicycle crank set, comprising:
- a. a first tubular member;
  - b. a second tubular member;
  - c. a spider connected to the second tubular member; and
  - d. a coupling securing the first tubular member to the second tubular member;

wherein the first and the second tubular members each include:

- a. a crank arm; and
- b. a portion of a crank axle with the crank arm and the portion of the crank axle being a continuous, monolithic thin-wall tubular structure.

56. The crank set of claim 55, wherein the portion of the crank axle is one-half axle length of the crank set.

57. The crank set of claim 55, wherein the tapered crank arm has an elliptical cross-section distributing stresses uniformly and equally over the length of the crank arm.

58. The crank set of claim 57, wherein the first and second tubular members are injection molded, of an aramid fiber composite material.

59. A method for assembling a crank set within a bracket shell of a bicycle, comprising:

- a. threading outer cups of a bearing set into each of two ends of the bracket shell;
- b. inserting inner cups of the bearing sets onto each of a crank axle portion of two crank set members;
- c. inserting the crank axle portion of one of the two crank set members into each end of the bracket shell within the outer cups and retaining rings of each bearing set;
- d. interlocking the crank axle portions of the two crank set members;
- e. preloading the two bearing sets; and
- f. securing the outer cups to the bracket shell.

60. The method of claim 59, wherein the two crank axle portions of the crank set members are interlocked by fitting a tenon member on an end of one crank axle portion into a mortise member on an end of another crank axle portion.

61. The method of claim 60, wherein the tenon member is fitted into the mortise member by an attachment bolt, the attachment bolt passing through a clearance hole in an end of one crank axle portion and threadably attaching to an attachment hole in an end of another crank axle portion.

62. A bicycle crank set comprising:

- a. a pair of hollow L-shaped tubular members, each being of unitary construction and having one-piece continuous walls, each of said members comprising:
  - i. a first leg having respective first and second closed ends;
  - ii. a second leg joining said first leg at a position between the axial midpoint of said first leg and a second end of said first leg, said second leg having an open end remote from position of juncture with said first leg;
  - iii. interiors of said legs of respective tubular members being in open communication with each other;
  - iv. first closed ends of said L-shaped tubular members being rounded;
  - v. a second one of said tubular members having a spider integrally formed therein as a part of said one-piece continuous wall, proximate said second closed end, coaxially with said second leg of said second tubular member, said spider being adapted for driving engagement with a conventional bicycle drive chain;
  - vi. said members being adapted for coaxial interfitting joining at convoluted open ends of respective second legs for unitary rotation about a common axis of said second legs;  
and
- b. releasable means for clampingly securing said second legs for said

unitary rotation when said convoluted open ends are matingly engaged, comprising:

- i. an outer sleeve surrounding said matingly engaged second legs;
- ii. a radially expandable inner sleeve positioned within said matingly engaged second legs, including an axially tapered interior surface, adapted to expand outwardly against inner annular surface of said second legs and urging said second legs outwardly into tight fitting contact with said outer sleeve;
- iii. a threaded stud coaxially located within said inner sleeve;
- iv. externally axially tapered bushing means threadedly engaging said stud and axially slidably contacting the interior of said inner sleeve upon rotational axial movement of said bushing along said stud;

Wherein rotation of said stud results in bushing axial movement therealong moving said inner sleeve radially outwardly against annular interior surfaces of said second legs, urging said second legs outwardly into tight fitting contact with said outer sleeve and sandwiching said second legs therebetween for unitary rotation one with another.